Small Business Innovation Research/Small Business Tech Transfer

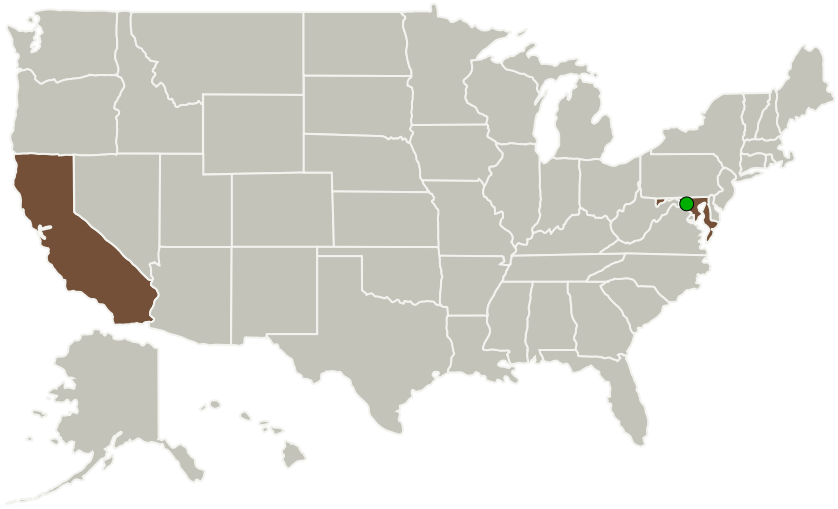
Innoflight Middleware System (IMS), Phase I

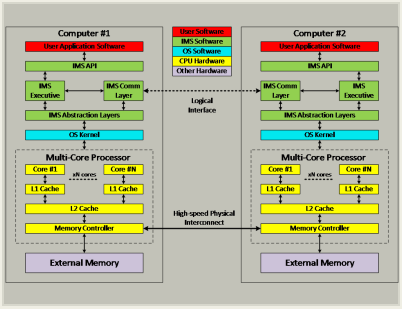
Completed Technology Project (2016 - 2016)

Project Introduction

Space missions can benefit greatly from the use of the latest COTS processing technology in order to allow spacecraft to perform more onboard computation using less power. This trend has accelerated in recent years due to the explosion of low-power commercial processing technology driven by mobile devices such as smartphones and tablets. Many of these advanced devices contain multiple processing cores, and some are full System-on-Chip (SoC) parts that include GPU processor arrays or FPGA fabric. However, while these COTS multi-core processors have tremendous capability, they are not designed to be tolerant to the radiation effects that are experienced in the space environment. One approach to increasing the reliability of COTS processors in space is to implement redundancy within the software framework. With this technique, the multiple cores in a processing device and even multiple independent computers can be operated in any combination of parallel processing (for enhanced performance) and redundantly (for enhanced reliability). For this proposed project, we plan to develop the Innoflight Middleware System (IMS) in order to provide this capability.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Innoflight, Inc.	Lead Organization	Industry Veteran-Owned Small Business (VOSB)	San Diego, California
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
California	Maryland

Project Transitions

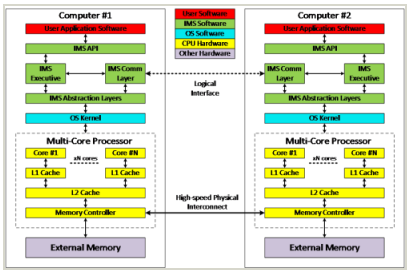
June 2016: Project Start

December 2016: Closed out

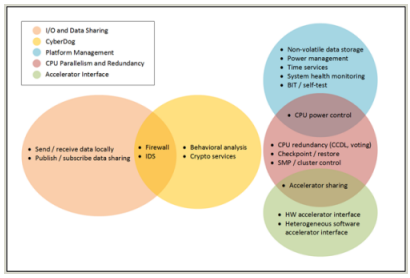
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139854)*

Images



Briefing Chart Image
Innoflight Middleware System (IMS), Phase I
(https://techport.nasa.gov/image/128544)



Final Summary Chart Image
Innoflight Middleware System (IMS), Phase I Project Image
(https://techport.nasa.gov/image/129057)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Innoflight, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

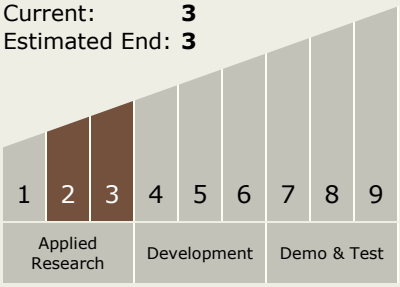
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Jonathan Wolff

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX02 Flight Computing and Avionics
  - TX02.2 Avionics Systems and Subsystems
    - TX02.2.8 Use of Advanced Commercial-off-the-Shelf (COTS) Technologies

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System